

TUNED HELMHOLTZ RESONATOR WITH CAVITY FORCING**ABSTRACT OF THE DISCLOSURE**

A Helmholtz resonator includes a chamber at least partially defining a cavity. The
5 chamber has a neck which defines a passage that is in fluid communication with the cavity.
The chamber and the neck produce a passive response to a sound wave produced by the
internal combustion engine. The sound wave negatively effects engine performance. An
active resonator is disposed within the chamber. The active resonator produces a forced
response for supplementing the passive response and increasing the band width of the noise
10 attenuating pressure wave. The Helmholtz resonator is in fluid communication with a portion
of an air induction system that defines a passageway that carries the sound wave. A driver is
connected to the active resonator, which is preferably a loud speaker, to drive the loud
speaker and produce the forced response. The driver preferably utilizes a signal source, such
as an engine speed signal, to synchronize the forced response with the engine speed. A phase
15 compensator synchronizes the forced response with the sound wave, and an amplifier
amplifies the signal to drive the loud speaker.